QUALITY ASSURANCE PROJECT PLAN FOR EXTENT OF WTC INDOOR DUST TEST AND CLEAN PROGRAM

*** DRAFT ***

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Based on the US EPA Region 2 Guidance for the Development of Quality Assurance Project Plans for Environmental Monitoring Projects (April 2004) and the Intergovernmental Data Quality Task Force Uniform Federal Policy for Quality Assurance Project Plans Manual VI (July 2004) Must be updated to conform to requirements at time program is implemented

TITLE AND APPROVAL PAGE

EPA Contract No.:

Project Name: WTC Indoor Dust Test and Clean Program

Quality Assurance Officer:

EPA Project Officer:

EPA Quality Assurance Officer:
Organization: US Environmental Protection Agency
Address: 2890 Woodbridge Ave., Ms100
Edison, NJ 08837-3679
Contact Number:
Approval Date: _____
Signature: _____

ACRONYMS

ASTM	American Society for Standards and Materials
CLP	Contract Laboratory Program
COPC	Contaminants of Potential Concern
CRDL	Contract-required detection limit
DEP	New York City Department of Environmental Protection
DQI	Data quality indicator
DQO	Data quality objective
EPA	Environmental Protection Agency
EPIC	Environmental Photographic Interpretation Center
FSAP	Field sampling and analysis plan
F2L	Forms II Lite
GC	Gas chromatograph
GC/MS	Gas chromatograph/mass spectrometer
GIS	Geographic information system
GPS	Global positioning system
HASP	Health and Safety Plan
HEPA	High Efficiency Particulate Air
HUD	Housing and Urban Development
HVAC	heating, ventilation, and air conditioning
IDQTF	Intergovernmental Data Quality Task Force
LCS	Laboratory control sample
LFB	Laboratory fortified blank
LIMS	Laboratory information management systems
MCL	Maximum contaminant level
MDL	Method detection limit
MMVF	man-made vitreous fibers
MPC	Measurement performance criteria
MQO	Measurement quality objectives
MS/MSD	Matrix spike/matrix spike duplicate
MSR	Management systems review
NEIC	National Enforcement Investigations Center
NIST	National Institute of Standards and Technology
NVLAP	National Voluntary Laboratory Accrediation Program
OEI	EPA Office of Environmental Information
OSHA	Occupational Safety and Health Administration
PAHs	polycyclic aromatic hydrocarbons
PARCC	Precision, accuracy, representativeness, completeness, and comparability
PCBs	Polychlorinated biphenyls
PDF	Portable document format
PT	Proficiency testing (previously known as performance evaluation (PE) sample)
PQOs	Project quality objectives
QA	Quality assurance

QATS	Quality Assurance and Technical Support
QC	Quality control
QS	Quality system
QAPP	Quality Assurance Project Plan
QL	Quantitation limit
QMP	Quality management plan
RPD	Relative percent difference
RSD	Relative standard deviation
RT	Retention time
SAP	Sampling and analysis plan
SC	Site Coordinator
SD	Standard deviation
SDG	Sample delivery group
siteID	sample identification number
SOP	Standard operating procedure
SQLs	Sample quantitation limits
SRM	Standard reference material
SVOC	Semivolatile organic compound
TBD	To Be Determined
TCLP	Toxicity characteristic leaching procedure
TSA	Technical systems audit
UFP	Uniform Federal Policy
VOA	Volatile organic analytes
VSP	Visual Sample Plan
WTC	World Trade Center

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1.0 Introduction

Presented herein is the site Quality Assurance Project Plan (QAPP) for the World Trade Center Indoor Dust Test and Clean Program. The site QAPP has been developed in accordance with the United States Environmental Protection Agency (EPA) requirements for Quality Assurance Project Plans, EPA QA/R-5, EPA/240/B-01/003, March 2001 and the *Uniform Federal Policy for Quality Assurance Project Plans* (the UFP-QAPP Manual), EPA 505-B-04-900A, Version 1, July 2004. It will be revised to meet the standards applicable at the time the program is implemented. This plan is based on information currently available and may be modified on site in light of field observations/results and other acquired information. Any modifications or deviations from this QAPP shall be approved by EPA and documented. Procedures for modifying the QAPP are discussed in Section 12.1, Assessment Findings and Corrective Action Responses.

The area that is included in this program is bounded on the north by Canal Street and on the east by Allen-Pike Street. Figure 1 shows the area that is included in this program. **[contractor's name]** have been contracted by the EPA to serve as the Project Primary Contractor for field sampling for all of the buildings in all of the strata. If any cleanup work is required due to the criteria specified in the Sampling and Analysis Plan (SAP) for this program, that work shall be conducted by licensed asbestos and/or lead contractors and certified asbestos and/or lead workers (Cleanup Contractor) licensed and certified by the New York City Department of Environmental Protection and/or the New York State Department of Labor. The Cleanup Contractor will be contracted by the EPA or through the Primary Contractor.

The Primary Contractor, or its assigned Project Monitor, is to conduct site inspections, surveys and assessments, scheduling, coordinating and monitoring the collection of environmental samples and the cleanup of dust/debris, if necessary, from buildings. The full scope of work is detailed in the Primary Contract Scope of Work. EPA's Site Coordinator (SC), shall provide overall technical oversight for the project. The EPA shall provide technical assistance to ensure that the work conducted is completed safely, efficiently, and in compliance with the Scope of Work and all applicable laws, rules and regulations.

This QAPP addresses the following environmental data collection aspects of the program: wipe samples shall be analyzed for the contaminants of potential concern (COPC) lead and polycyclic aromatic hydrocarbons (PAHs); microvac samples shall be analyzed for the COPC asbestos and man-made vitreous fibers (MMVF); and bulk dust and high efficiency particulate air (HEPA) vacuum samples shall be analyzed for lead, PAH, asbestos and MMVF. Where possible indoor air, wipe and microvac samples will be taken in proximate locations, so that for each location sampled within a unit, there will be measurements of the four COPC. Indoor air samples in common areas shall be collected and analyzed for asbestos and MMVF in order to determine whether an association exists between them and common area wipe and microvac COPC and HVAC COPC.

Additionally, the QAPP addresses the collection of HEPA vacuum samples from heating,

ventilation, and air conditioning (HVAC) units within buildings. The HEPA vacuum samples shall be used in this instance to collect composite samples to be analyzed for asbestos, MMVF, PAHs, and lead in the HVACs ; and, the HVAC filters shall be used to collect bulk samples to be analyzed for asbestos, MMVF, lead, and PAHs that may originate from air fed to the HVACs.

Note that the various specifications and requirements (such as, but not limited to, sampling and analytical procedures, sample quantities, and QC activities) shall be periodically reviewed and may be changed to reflect project experience. This QAPP shall then be updated accordingly**.** These changes shall be signed by project management, attached to the QAPP, and distributed to all who have received the QAPP.

1.1 Distribution List

The Distribution List documents who shall receive copies of the approved QAPP and any subsequent revisions or amendments to the QAPP. The **[contractor's name]** professionals listed below shall distribute the QAPP to all project team members and shall ensure that the project team members are familiar with any and all QA issues. A complete copy of the QAPP and any subsequent revisions shall be maintained on file at the **[contractor's location]** office and shall be available to EPA Region II upon request. The Distribution List is identified as Table 1 in this QAPP.

1.2 Project Personnel Sign-Off Sheet

The Project Personnel Sign-Off Sheet documents that all key project personnel performing work have read the applicable sections of the QAPP and shall perform the tasks as described. For example, the laboratory manager who receives the QAPP shall have all supervisory personnel sign off on the applicable analysis sections of the QAPP before beginning sample analysis. Supervisory or oversight personnel are responsible for communicating the requirements of the applicable portions of the QAPP to those doing work. Although it is not always possible to identify people by name early in the planning stages, the project team shall identify by function (e.g., laboratory QC manager) all personnel who are to read and sign off on the applicable sections of the QAPP. Attachment 1 (Project Personnel Sign-Off Sheet) shows what information to include in the original QAPP and all revisions.

2.0 Project Organization

Sections 2.1 through 2.5 of this QAPP shall identify the reporting relationships between the organizations, project team members, and other key project personnel and describe their specific roles, responsibilities, and qualifications. In addition, the QAPP includes an explanation of the lines of authority and paths of communication.

EPA shall have the oversight authority for all work conducted for this project. The Primary Contractor shall schedule and oversee the work of the Sampling, Cleanup, Contractors/Sub-Contractors, conduct environmental sampling and assessments, arrange for the shipment of field

samples and quality control samples to the laboratories, input the relevant data into the appropriate databases, and other similar duties as described in its contract Scope of Work. The analytical laboratories shall conduct the required analysis within the requested turnaround time, input the relevant analytical data into the appropriate databases, arrange for the shipment of archival samples, and other similar duties as described in its contract Scope of Work. All data for this project are considered confidential and only the EPA Site Coordinator (SC) is authorized to allow for their release.

2.1 Project Organization Chart

The Project Organizational Chart shows the reporting relationships between all of organizations involved in this project, including the lead organization (i.e., EPA) and all contractors and subcontractors. **[contractor's name]** principal in charge/project manager shall identify the organizations providing field sampling, on-site and off-site analysis, and data review services, including the names and telephone numbers of all project managers, project team members, and project contacts for each organization. The project organizational chart is shown in Table 2 **[To Be Developed by Contractor]** of this QAPP.

2.2 Communication Pathways

The flow of information from the time the samples are collected to the notification of the residents and owners is as described below:

1. Primary Contractor collects environmental and QC samples
   a. QC sample designations are not available to the laboratories
   b. Sampling information are entered into the project database via Forms II Lite or Scribe or an alternative electronic format that is approved by EPA
   c. Samples are sent to respective laboratories for analysis
   d. Validated results are sent to EPA

1. Laboratories analyze environmental and QC samples
   a. Analysis results are transmitted electronically to the Data Validators and to Primary Contractor
   b. Complete data validation package shall be prepared for 20% of the samples by the laboratories and these results also shall be transmitted to the Data Validators and Primary Contractor

1. Daily communication of samples received
   a. Primary Contractor and/or Laboratories shall communicate daily with Data Validators and with EPA Region 2 to confirm the shipment and receipt of samples.
   b. Primary Contractor and/or Laboratories shall communicate daily with Data Validators and with EPA Region 2 on any issues which occurred during the sampling event and during shipment.

1. Data Validator conducts data validation

a. Validated results are entered into the project database via Forms II Lite or Scribe or an alternative electronic format that is approved by EPA
b. Validated results shall be provided from the data validator to the Primary Contractor who would then provide them to EPA Region 2

2. EPA Region 2 reviews and accepts result deliverables
   a. Validated test results are reviewed by EPA Risk Assessors
   b. Deliverables are approved and accepted
   c. Validated test results are uploaded into a database at EPA
   d. Cleaning recommendations, if necessary, are reviewed by EPA Site Coordinator

3. Occupants and Building Owners/Operators are provided with their respective results

   a. Cleaning recommendation, if necessary, will be offered by the EPA
   b. Written notifications of analytical results will be provided by the EPA

The following communication drivers are those activities that shall necessitate communication between the Primary Contractor's Project Monitor and EPA's Site Coordinator. These drivers shall include:

- Approval of amendments to the QAPP;
- Initiation, notification and/or approval of real time modifications;
- Notification of delays or changes to field work;
- Recommendations to stop work and initiation of corrective action; and
- Reporting of issues related to analytical data quality, including, but not limited to, ability to meet reporting limits and turn around times.

2.3 Data Confidentiality

The residential and building information and the environmental data collected for the project shall be used by the EPA to evaluate whether a unit or a building has been impacted by the COPC and to determine if a cleaning is necessary. Although the data are collected only for informational use and not for enforcement purposes, the information shall be considered confidential. Only the EPA is authorized to release any data collected for this project. EPA shall only share individual unit's information with the person who signed the access agreement for the unit or his or her designated representative. Building owners/operators shall receive the various units data from common or other areas to which they provide access. However, the EPA may aggregate the data without personal-identifiable information for further studies or reports.

2.4 Personnel Responsibilities and Qualifications

The EPA has the oversight authority for all work conducted for this project. The Primary Contractor shall schedule and oversee the work of any of its Sampling and Cleanup Sub-

Contractors, conduct environmental sampling and assessments, arrange for the shipment of field samples and quality control samples to the laboratories, input the relevant data into the appropriate databases, and other similar duties as described in its contract Scope of Work. The analytical laboratories shall conduct the required analysis within the requested turnaround time, input the relevant analytical data into the appropriate databases, arrange for the shipment of archival samples, and other similar duties as described in its contract Scope of Work. All data for this project are considered confidential and only EPA is authorized to allow their release.

2.4.1 EPA Responsibilities

EPA has prepared the draft sampling QAPP. The EPA Site Coordinator shall provide technical assistance to ensure that the sampling work and cleanup activities, if necessary, are completed safely, efficiently, and in compliance with the applicable Scope of Work and all applicable laws, rules and regulations. The EPA has contracting authority for the Primary Contractor and any site-specific sampling/cleanup contracts. The EPA's Contracting Officer shall process any disputes or claims related to the cleaning contracts. Where asbestos or lead is involved EPA's Contract Officer also shall coordinate with the New York City Department of Environmental Protection (DEP) on work inspection, acceptance or rejection, and any stop work orders. The EPA has arranged for the laboratory analysis of all of the samples. The Primary Contractor is responsible for transfer of custody of the samples to the laboratories via same-day hand-carry delivery or by courier for next day delivery as per the Primary Contract.

[person's name] of the EPA has the designated responsibility for approving and accepting final products and deliverables.

EPA's (Quality Assurance and Technical Support) QATS contractor is responsible for designing and implementing a program to review all laboratory data analysis to achieve the following objectives: Data Review, Validation and Verification, and Reconciliation with User Requirements.

The EPA shall notify occupants and building owners as specified in Section 2.2 (Communication Pathways). Neither the primary contractor nor any of the subcontractors are authorized to release residential and non-residential area sampling results.

2.4.2 Primary Contractor Responsibilities

The Primary Contractor will revise the draft QAPP as necessary to prepare the final QAPP. The Primary Contractor and its subcontractors involved in the activities at buildings under this project are responsible for completing a background check on their employees before beginning on-site work and for screening unacceptable candidates from the pool of on-site workers. The background checks shall be evaluated in accordance with the Robert T. Stafford Disaster Relief and Emergency Assistance Act (the Stafford Act), 42 USC Section 5121. Contractors are required to maintain records of background checks for four (4) years and to make them available to the EPA when requested. At a minimum, the background check must include:

1. Law enforcement checks (five (5) years)

2. Professional license and certification

The Primary Contractor shall adapt, adopt and follow the Quality Assurance Project Plan prepared by EPA for all environmental data collection activities performed for this project. All appropriate data, original field forms/data sheets, and chain-of-custody forms shall be collected and completed in accordance with the instructions contained in the contract and provided to EPA.

The Primary Contractor shall have available sufficient qualified personnel and sufficient quantities of sampling equipment to provide the amount and type of samples required for this project. The Primary Contractor must follow the established quality assurance activities for all phases of field sampling work and laboratory quality control checks.

The Primary Contractor or its Sub-Contractors are responsible for conducting personal air monitoring of the cleanup workers and arrange for the sample analysis in accordance with Occupational Safety and Health Administration (OSHA) regulations. The Primary Contractor shall provide the test results to the EPA and OSHA for their evaluation. Additionally, the Primary Contractor or its Sub-Contractors shall provide test results to its employees.

The Primary Contractor or its Sub-Contractors shall collect the samples from the buildings. The Primary Contractor shall collect post-cleanup samples from certain cleaning and sampling units and/or buildings. These units and/or buildings shall be selected based on guidelines in Section 7.1 (Sampling Process Design and Rationale).

The Project Monitor shall keep a field notebook, document the size of the sampled area, sampling locations and equipment used to collect the samples (leaf blower, fan, etc.). In addition, date, start and completion dates for the cleaning, sample media, filter type, lot numbers of filter media, time (start/finish), weather, units, quality assurance samples (lot blank) sampling dates and sample identification numbers (sample IDs), complete chain-of-custody forms, EPA Project Tracking Numbers and laboratory address shall be entered into Form Lite II or Scribe or an agreed upon electronic format and/or website approved by EPA within 24 hours of activity.

2.4.3 Analytical Laboratory Responsibilities

Subsections 2.4.3.1 through 2.4.3.3 describes the analytical laboratory responsibilities for this project.

2.4.3.1 Lead, PAHs, MMVF, and Asbestos Wipe, Microvac and Air Samples

[name of lab] has been retained by the EPA for the sample analyses for lead, PAHs, MMVF, and asbestos from wipe, microvac and air samples. It is responsible for conducting the analyses in accordance with the specified methods, submitting the test results to the EPA in the form and

within the time required by the EPA. **[name of lab]** is also responsible for preparing the post-analysis wipes for archival purposes and transferring custody of the same as required by the EPA. Contact and shipping information for **[name of lab]** are listed below:

[address of lab and name and phone number of point of contact for lab]

A 14-day turnaround time is requested for sample analysis for lead, PAHs, MMVF, and asbestos. Validated results shall be available three days after the availability of the laboratory results.

2.4.3.2 HEPA and HVAC Unit Filter Bulk Dust Samples

[name of lab] has been retained by the EPA for the bulk dust sample analysis for COPC (lead, PAHs, asbestos, and MMVF) from HEPA vacuums and HVAC unit filters. It is responsible for conducting the analyses in accordance with the specified methods, submitting the test results to the EPA in the form and within the time required by the EPA. **[name of lab]** is also responsible for preparing the post-analysis filters for archival purposes and transferring custody of the same as required by the EPA. Contact and delivery information for **[name of lab]** are listed below:

[address of lab and name and phone number of point of contact for lab]

A 2 week turnaround time is requested for the bulk dust analyses. Validated results shall be available three days after the availability of the laboratory results.

2.4.3.3 Laboratory Turnaround Time

The laboratory contractor shall analyze all samples at the specified time noted on the COC. All turnaround time discrepancies between the COC and the QAPP shall be reported to the EPA Site Coordinator. The requested laboratory analysis result turnaround times, for the microvac samples, wipe samples, and HEPA and HVAC unit filter bulk dust samples are summarized in Table 3 below.

Table 3. Laboratory Turnaround Time for Sample Analysis

Parameter	Sampling Technique	Analysis Laboratory	Requested Analysis Turnaround Time	Validated Results (Post Analysis)	Validation Documentation Turnaround Time
Lead	Wipe	**[name of lab]**	14 days	3 days	5 days
PAHs	Wipe	**[name of lab]**	14 days	3 days	5 days
MMVF	Microvac, air	**[name of lab]**	14 days	3 days	24 hours
Asbestos	Microvac, air	**[name of lab]**	14 days	3 days	24 hours

COPC (lead, PAHs, MMVF, & asbestos	HEPA or Bulk Dust	**[name of lab]**	14 days	3 days	5 days

2.5 Special Training Requirements and Certification

All management and field personnel conducting sampling activities must have extensive experience in the implementation of field sampling programs. Prior to work on this project, field team personnel shall receive project specific training regarding the requirements of this project as detailed in this QAPP and the project Health and Safety Plan (HASP). All field sampling personnel shall have current 40-hour OSHA HAZWOPER training.

All contractors and subcontractors involved in the monitoring activities at buildings under this contract are responsible for completing a background check on their employees prior to employees beginning on-site work and for screening unacceptable candidates from the pool of on-site workers. Contractors are required to maintain records of background checks for 4 years and to make them available to the EPA when requested.

Proof of Primary Contractor personnel qualifications must be presented upon request, including qualifications for wipe sampling, HEPA vacuum and microvac sampling, personal monitoring and HVAC evaluations. The laboratory contractor shall be certified by the National Voluntary Laboratory Accrediation Program (NVLAP). Certification is required to have a high level of quality documentation essential for achieving and maintaining the highest quality in standard industry practices.

2.5.1 Project Monitors

The Project Monitors must possess valid New York State (NYS) Asbestos and Lead Project Monitor certificates. The Project Monitors must have served as a third party project monitor on at least 25 asbestos and lead abatement projects. Project Monitor must have performed final clearance inspections on at least 25 asbestos and lead abatement projects. The Project Monitor must have access to translation services to schedule unit inspections with residents, workers, and/or owners.

2.5.2 HEPA Vacuum and Microvac Technicians

HEPA vacuum and microvac sampling technicians must have at least one year experience in HEPA vacuum and microvac sampling for a variety of contaminants. Employees shall have received specific training in HEPA vacuum and microvac sampling methods.

2.5.3 Wipe Sampling Technicians

Wipe sampling technicians must have at least one year experience in wipe sampling for a variety of contaminants. Employees shall have received specific training in wipe sampling methods.

2.5.4 Air Sampling Technicians

Air sampling technicians must have at least one year experience in air sampling for a variety of contaminants. Employees shall have received specific training in air sampling methods.

2.5.5 HVAC System Inspectors

HVAC assessments and cleanliness inspections shall be conducted by qualified personnel. At a minium such personnel shall have an understanding of HVAC system operation and experience in utilizing accepted indoor environmental sampling practices, current industry HVAC cleaning procedures, and applicable industry standards. Qualifications for members of the HVAC evaluation team are specified in Attachment 4, Indoor Dust Sampling Protocols.

3.0 PROJECT PLANNING (SCOPING)

3.1 Project Background

This QAPP is the result of ongoing efforts to monitor the current environmental conditions for residents and workers impacted by the collapse of the WTC towers. The SAP describes the approach to be used to evaluate the presence and levels of contaminants of potential concern in buildings in lower Manhattan. This plan is a modification of a earlier versions announced in October 2004 and June 2005. The draft final plan reflects appropriate elements from the comments received from the public, individual members of the WTC expert technical review panel and subsequent discussion and review by EPA staff. EPA will offer a voluntary test, and clean program targeted at the area below Canal Street and west of Allen-Pike Street that was targeted in the original dust cleanup program. This area entirely contains the area where visible contamination with WTC dust was confirmed by EPIC. Services will be offered as described in the SAP. There will be a period of 2 months during which residents and building owners in this area may make requests to participate in this program. Employees and employers will not be eligible for this program.

4.0 Development of Project Quality Objectives (Site Specific PQOs)

Concurrent efforts have the following Project Quality Objectives:

(1) To measure the asbestos, lead, MMVF and PAH content of dust samples obtained from volunteered spaces within buildings in lower Manhattan;

(2) to gather information on potential interrelations between building construction, the presence of contaminants in central heating, ventilation, and air conditioning (HVAC) systems and the presence of asbestos, lead, MMVF and PAHs in accessible and infrequently accessed areas; and

(3) to provide data to support the decision of whether or not cleaning should proceed in the units and buildings sampled.

4.1 Measurement Performance Criteria

The QA program shall incorporate Quality Control (QC) procedures for field sampling, chain of custody, laboratory analyses, and reporting to assure generation of sound analytical results. A number of QC samples are to be collected and analyzed during this project (such as blanks and duplicates). Their use, in general, is to ensure that the measurement process is in control and is producing reliable data.

The QC results may be used to assess the ongoing validity of the process and/or to determine whether modifications to the process would be appropriate. Project management shall review the individual and cumulative QC results periodically for this purpose. One result of this review may be the decision to reduce or eliminate one or more type of QC sample, if the results show that it is not needed. Another result may be the decision to increase the frequency of duplicates if the initial duplicates show great variation between the co-located pairs indicating that the number of sample(s) being collected per unit may not produce a representative characterization of that unit.

The QA Protocols for this sampling event are applicable to all sample matrices and include:

1. Sample documentation in the form of field logbooks, appropriate field data sheets, and chain of custody records.

2. Calibration and inspection of all monitoring and/or field-portable analytical equipment prior to collection and analyses of samples with results and/or performance check procedures/methods summarized and documented in a field, personal, and/or instrument log notebook.

3. Field or laboratory determined method detection limits (MDLs) shall be recorded along with corresponding analytical sample results, where appropriate.

4. Analytical holding times as determined from the time of sample collection through analysis. These shall be documented in the field logbook or by the laboratory in the final data deliverable package.

5. Initial and continuous instrument calibration data.

6. QC blank results (rinsate, trip, method, preparation, instrument, etc.), as applicable.

7. Collection and analysis of blind field duplicate and MS/MSD QC samples to provide a quantitative measure of the analytical precision and accuracy, as applicable.

8. Use of the QC procedures specified in this QAPP for QC analyses and data validation.

5.0 Secondary Data Evaluation

The results from sampling in this program will be considered by EPA to make recommendations about unit, common area and HVAC cleanups. Source attribution will also be considered such as: location and amount of friable asbestos material present in sampled space; location and area of MMVF present (i.e., ceiling tiles, pipe insulation, spray on fireproofing); location and amount of chalking/peeling paint present; current use of space; significant particulate or combustion sources within sampling areas (e.g., fireplace, stove, occupant smokes); significant particulate or combustion sources within or adjacent to the building (e.g., above fast food restaurant, adjacent to emergency diesel generator exhaust, etc). Source attribution will be a critical factor in determining whether to reclean or retest after cleaning.

6.0 Project Overview

EPA will clean up building units and common areas found to have contamination above specified benchmarks. Building common area sampling data will be evaluated to determine the need for HVAC cleanup. An additional sampling objective is to attempt to ascertain the relationship between measurements and building cleaning history, construction, and the role of HVACs in the potential recirculation of COPC resulting from the collapse of the WTC.

All work shall be completed in accordance with the Primary Contractor's Statement of Work, this QAPP and its SAP, all reference sampling methods, and the Health and Safety Plan (HASP). No deviations from the Statement of Work, the SAP, this QAPP or the HASP shall be made without prior receipt of alternate technical direction issued by the EPA Site Coordinator.

All sampling methods, analytical methods, sampling locations, the number of buildings and their geographic locations, specific residential and/or non-residential units, shall be provided by EPA.

It is impossible to determine or address the various conditions that shall affect the sample locations. Actual sample locations shall be determined on a case by case basis in the field by the contractor with approval by the on-site EPA personnel. Every attempt shall be made to collect 100% of the proposed samples as specified in the SAP provided by EPA. In the event a sample can not be collected due to the unavailability of carpets, fabric furniture, or insufficient sample area, that sample shall not be collected and documentation of that fact recorded in the field log book.

6.1 Project Schedule

Work shall be scheduled, at a minimum, five days per week. Each building's work schedule is subject to the access schedules of the building owner and residents. The schedule shall also depend on the number of units per building that shall be sampled and cleaned, if necessary.

Table 11. Project Schedule

Task	Anticipated Completion Date	Performed By
Kick-Off Meeting		
Draft QAPP & HASP submission		
Final QAPP submission		
Field work (sampling event at buildings)		Field Staff
Field Status Report/QA Management Report	Every Wednesday during field work	
Analytical Report(s)	Analytical Reports submitted daily with 20% of the total samples collected during the project fully validated and submitted in a Final Analytical Report at the completion of the project.	
Final Project Report	30 days from completion of project	

7.0 SAMPLING TASKS

7.1 Sampling Process Design and Rationale

In the absence of a measure that can identify WTC dust, EPA will offer a voluntary test, and clean, as necessary, program targeted at the area below Canal Street and west of Allen-Pike Street that was targeted in the original dust cleanup program. This area entirely contains the area where visible contamination with WTC dust was confirmed by EPA's Environmental Photographic Interpretation Center. By examining satellite photography and other evidence, this organization determined the visible extent of deposition of WTC dust and debris. The ground dust/debris boundaries shown in the report were derived from the analysis of multiple images taken between September 11 and September 13, 2001. "Confirmed dust/debris" areas extend to approximately Chambers Street, "probable dust/debris" areas extend to approximately Canal Street, and "possible dust/debris" areas extended to approximately Spring Street on the West side near the Holland Tunnel. The "confirmed dust/debris" area is the area that EPA believes was most heavily impacted by the dust generated when the towers collapsed.

All buildings and units tested will have a number of characteristics recorded. A major use for

the information is to evaluate whether differences exist between units or buildings that exceed the benchmarks described below and those that do not. Building and unit characteristics that may be relevant are described below. This section provides an overview of the strategy to characterize units, the common areas within buildings, and HVACs within buildings, if present. The Quality Assurance Project Plan (QAPP) describes in detail the protocol for how to determine where and how much to sample within common areas and units, and how to sample HVACs.

A "unit" generally denotes a reasonably well defined section of a floor that will be different for each building and building type. For example, a unit within a residential building could be an apartment.

Three sets of dust samples will be taken within each unit: 1) three or more samples at locations where dust-related exposures are likely to occur, such as in elevated horizontal surfaces (e.g., desk or table tops) and floors, 2) three or more samples at locations where WTC dust may have accumulated but would not have frequently been cleaned, such as on top of cabinets and 3) a single composite sample from "inaccessible" locations where cleaning is unlikely. The first set of samples will be termed, "accessible" samples, the second, "infrequently accessed" samples, and the third "inaccessible" samples. Samples from the first two locations will be taken by wipes and microvacs. These samples will yield results in load (weight or fibers per unit area) and will be compared to benchmarks.

The sample from the third set of locations ("inaccessible") will be bulk dust samples or collected by HEPA vacuums and will yield results in concentration (weight or fibers of contaminant per weight of sample). The location of many of the inaccessible areas makes it impractical to obtain load samples (mass per unit area) that could be related to the benchmarks. Concentration (weight per weight) of a contaminant in settled dust is a poor indicator of risk. A very dusty environment may pose a risk even if the concentration in dust is low. Conversely, an environment with little dust would not pose a risk even if there were a high concentration of the contaminant in the small amount of dust. Therefore, the "inaccessible" area sample results will be used to screen for potential reservoirs of COPC in dust. "Inaccessible" area sample results will not trigger a cleaning.

Wipe samples will be analyzed for the COPC lead and polycyclic aromatic hydrocarbons (PAHs), microvac samples will be analyzed for the COPC asbestos and man-made vitreous fibers (MMVF), and bulk dust and HEPA vacuum samples will be analyzed for all four COPC. Wipe and microvac samples will be taken in proximate locations, so that for each location sampled within a unit there will be measurements of the four COPC. Indoor air samples will also be collected in units and common areas at locations proximate to the locations where accessible dust samples are collected. Indoor air samples will be analyzed for asbestos and MMVF.

The analytical results from these samples, both the air samples and the dust samples (not including the inaccessible area dust samples), will be used to determine whether or not a

cleaning will be offered to the occupant or owner of the unit or common area being tested. In general, a cleanup will be offered if a benchmark for any of the COPC is exceeded in a unit or building common area tested. EPA will conduct surveys to determine if the exceedance may be attributed to sources within or adjacent to the place of business or residence. If they are, this information will be considered in conjunction with information on building cleaning history to determine whether clearance sampling or further cleaning will be offered.

7.2 Sampling Procedures and Requirements

The Contractor shall collect samples for asbestos, MMVF, lead, and PAHs as well as QC samples, in accordance with this QAPP and Attachment 4, Indoor Dust Sampling Protocols.

Quality control (QC) samples shall be used to assess the sampling and analytical processes and to ensure that these processes are being conducted properly. QC samples shall be collected during each day of sampling. These samples include the collection of field spike samples, field blanks, duplicates, and lot blanks (see Section 10.1, Sampling and Analytical Quality Control Samples for details).

The Primary Contractor and/or its Sub-Contractor shall collect wipe, micro-vacuum, indoor air (when so directed by EPA), HVAC filter, and HEPA vacuum samples from a minimum of 300 residential and non-residential buildings, as well as from central heating, ventilation, and air conditioning (HVAC) units, as determined by the EPA. The Primary Contractor and/or its Sub-Contractor shall perform all field activities utilizing the appropriate field sampling and analytical methods as specified in Tables 4 and 6.

Three sets of dust samples shall be taken within each unit as specified in Attachment 7 of the QAPP: 1) three or more samples at locations where dust-related exposures are likely to occur, such as in elevated horizontal surfaces (e.g., desk or table tops) and floors, 2) three or more samples at locations where WTC dust may have accumulated but has not frequently been cleaned, and 3) a single composite sample from locations where cleaning is unlikely. The first set of samples will be termed, “accessible” samples and the second, “infrequently accessed” samples, the third “inaccessible” samples. Samples from the first two locations will be taken by wipes and microvacs. These samples will yield results in load (weight or fibers per unit area) and will be compared to benchmarks. The sample from the third set of locations (“inaccessible”) will be bulk dust samples or collected by HEPA vacuums and will yield results in concentration (weight or fibers of contaminant per weight of sample). The “inaccessible” area sample results will be used to identify potential reservoirs of contamination. “Inaccessible” area sample results will not trigger a cleaning.

Wipe samples will be analyzed for the contaminants of potential concern (COPC) lead and polycyclic aromatic hydrocarbons (PAHs), microvac samples will be analyzed for the COPC asbestos and man-made vitreous fibers (MMVFs); and bulk dust and HEPA vacuum samples will be analyzed for the COPC. Air samples will be analyzed for the COPC to determine whether air benchmarks are exceeded (see Table 12 below). Wipe and microvac samples will be taken in

proximate locations, so that for each location sampled within a unit, there will be measurements of the four COPC. Further detail on the strategy for unit selection, and then to select locations within units to sample are provided in Attachment 4 (Indoor Dust Sampling Protocols) of the QAAP.

Table 12. Sampling Technique and Parameters to be Analyzed

Sampling Technique	Lead	PAHs	Asbestos	MMVF
Wipes	**X**	**X**		
Microvac			**X**	**X**
bulk/HEPA	**X**	**X**	**X**	**X**
indoor air			**X**	**X**

The analytical results from these samples will be used to determine whether or not a cleaning will be offered to the occupant or owner of the unit being tested.

Results from common areas and HVAC units of a building will be used to determine whether a full building cleanup will be offered, and results from the study as a whole will be used to determine what further activities with regard to sampling or cleanup are warranted. Details on the criteria used to make these decisions are described in the SAP. Further, it should be noted that source attribution will be a critical factor in determining whether to re-clean if an initial cleaning is deemed necessary. Source surveys will be conducted as described in Attachment 4 of the QAPP and if it is found that the exceedance is due to a source within the building or adjacent to the building, no further cleaning to demonstrate clearance will be offered. Details on the survey(s) to be conducted can be found in Attachment 4 of the QAPP.

In order to characterize central HVAC units in buildings which have full or partial central HVAC units ("full" is defined as units serving both common areas and individual apartments, offices, etc; while "partial" is defined as units serving only common areas while apartments or offices have individual units), samples shall be taken by the Primary Contractor and/or its Sub-Contractor as specified in Attachment 7 of the QAPP and paraphrased below: 1) at least one HEPA vacuum composite sample per building from outdoor air inlets to HVAC; 2) at least one HEPA vacuum composite sample per floor from the air mixing plenums (or other areas with visible dust deposits) serving sampled floors; 3) at least one HEPA vacuum composite sample per floor from HVAC outlets discharging to locations where COPC samples are taken; and 4) at least one composite bulk sample per building from the HVAC filter(s) will be sampled.

7.2.1 Sampling Collection Procedures

Table 4 below summarizes the collection methods and procedures. The Contractor shall ensure that all project personnel collect representative samples in a consistent manner for all required

sample matrices and locations, that contamination is not introduced during collection, and that sample volumes are properly preserved in order to meet project objections.

Table 4. Sample Collection Methods and Procedures

Type of Location	Sampling Locations & Estimated Number of Samples	Parameter	Sampling Technique & Method	Collection Procedures
Accessible, Infrequently Accessed, & Inaccessible	See Attachment 7	Asbestos	Microvac ASTM D 5755-95	**See Attachment 4**
		MMVF	Microvac ASTM D 5755-95	**See Attachment 4**
		Lead	Wipe HUD App. 13.1	**See Attachment 4**
		PAHs	Wipe ASTM D 6661-01	**See Attachment 4**
HVAC	HVAC Systems-Inlet, outlet, and mixing plenum or other dead zone on each floor sampled See Attachment 7	Asbestos	HEPA	**See Attachment 4**
		MMVF	HEPA	**See Attachment 4**
		Lead	HEPA	**See Attachment 4**
		PAHs	HEPA	**See Attachment 4**
HVAC Filters	HVAC unit filters See Attachment 7	Asbestos	Bulk	**See Attachment 4**
		MMVF	Bulk	**See Attachment 4**
		Lead	Bulk	**See Attachment 4**
		PAHs	Bulk	**See Attachment 4**
Indoor Air Samples	See Attachment 7	Asbestos	NIOSH 7402	**See Attachment 4**
		MMVF	NIOSH 7402	**See Attachment 4**

7.2.2 Sample Containers, Volume, and Preservation

All glass sample containers shall meet the QA/QC specifications in OSWER Directive 9240.0-05A, "Specifications and Guidance for Contaminant Free Sample Containers". The Contractor shall maintain sample integrity in the field, prior to and during shipment to, and immediately upon receipt by, the off-site or mobile on-site laboratory. Table 5 below summarizes the sample containers, volume and preservation of samples required. The Contractor shall collect and contain samples as identified.

Table 5 **Sample Containers and Preservation**

Parameter	Sampling Technique	Sample Containers	Preservation

Asbestos	Microvac ASTM D 5755-95	Zip-lock plastic bag	**20° C**
MMVF	Microvac ASTM D 5755-95	Zip-lock plastic bag	**20° C**
Lead	Wipe HUD App. 13.1	50 ml polyethylene sample tubes	**20° C**
PAHs	Wipe ASTM D 6661-01	50 ml polyethylene sample tubes	**4° C**
Asbestos	HEPA and Bulk	32 oz glass jar or Zip-lock plastic bag	**20° C,**
MMVF	HEPA and Bulk	32 oz glass jar or Zip-lock plastic bag	**20° C**
Lead	HEPA and Bulk	32 oz glass jar or Zip-lock plastic bag	**20° C**
PAHs	HEPA and Bulk	32 oz glass jar or Zip-lock plastic bag	**20° C, 4 ± 2° C after sieving**
Asbestos	Indoor Air	Zip-lock plastic bag	**20° C**
MMVF	Indoor Air	Zip-lock plastic bag	**20° C**

7.2.3 Equipment/Sample Containers Cleaning and Decontamination Procedures

The Contractor shall ensure that collected samples are representative of the sampling location by verifying that sampling equipment is clean and free of target analytes/COPC or interferences. Cleaning and decontamination shall include all equipment that contacts the sample. If sampling equipment is disposable, procedures for cleaning and decontamination are not necessary. Equipment/sample containers cleaning and decontamination procedures are specified in Attachment 4 of the QAPP.

7.2.4 Field Equipment Calibration, Maintenance, Testing, and Inspection Procedures

The Contractor shall ensure that all sampling equipment is available and in working order when needed; that all field equipment, including tools gauges, pumps, etc. are calibrated to perform within specified limits; and that corrective action is taken to fix problems prior to and during field operations. The Contractor shall also establish record keeping for documenting field equipment calibration, maintenance, testing, and inspection activities and identify the availability of spare parts and equipment to ensure that project schedules are met. Field equipment calibration, maintenance, testing, and inspection procedures are specified in Attachment 4 of the QAPP.

7.2.5 Supply Inspection and Acceptance Procedures

The Contract shall ensure that all sampling supplies are free of target analytes/COPC and

interferences and provide inspection and acceptance requirements for any supplies or consumables that could affect data quality. Documentation shall include, but not limited to, supplies that shall be used during sampling, all vendors for supplies and reagents, specifications for all supplies and reagents that could affect data quality, procedures that shall be used to ensure supply cleanliness and reagent purity, procedures for measuring supply cleanliness, and corrective action procedures for preventing the use of unacceptable supplies. This information is contained in Attachment 5.

7.2.6 Field Documentation Procedures

The Contractor shall provide a permanent record of field activities and possible introduction of sampling error, observations and measurements taken in the field. All field data shall be recorded in field notebooks, on field data collection sheets, or electronically.

Field documentation shall be tracked. The title of each field notebook shall indicate its function, and each notebook used for a specific site or project shall be referenced to all other project notebooks, including the project manager's daily log. Each notebook shall also be tracked and archived with other project records in accordance with project data management. All Field notebooks shall be bound, water-resistant, sequentially numbered pages with indelible ink entries.

Field information shall be recorded for each matrix and each type of sampling procedure. Examples of data collection forms can be found in Attachment 6.

8.0 Analytical Tasks

The project-specific analytical measurement system shall include: on-site and off-site laboratory analytical SOPs; method-and laboratory specific QC measurements, acceptance criteria, and corrective actions; calibration procedures; and instrument, equipment, and supply maintenance, testing, and inspection requirements. Detailed information on analytical tasks can be found in Tables 6 and 7 below.

Table 6. Analytical Tasks

Analyte	Sample Matrix	Benchmarks	Analytical Method	Method Detection Limit	Laboratory Reporting Limit
Asbestos	microvac	Accessible loading 5000 structures/cm^2, Infrequently Accessed/HVAC 50000structures/cm^2	ASTM D 5755-95		

MMVF	microvac	Accessible loading 5000 structures/cm^2, Infrequently Accessed/HVAC 50000 structures/cm^2	TEM confirm with SEM/EDS if greater than benchmark		
Lead	wipe	Accessible loading 40 µg/ft^2 Infrequently Accessed loading 400µg/ft^2	SW-846 6010C		
PAHs	wipe	Accessible loading 150 µg/m^2 Infrequently Accessed loading 1.5 mg/m^2	ASTM 6661-01/SW-846 8270D		
Asbestos/ MMVF	HEPA and Bulk	None	PLM NYS 198.1 followed by TEM NYS 198.4		
Lead	HEPA and Bulk	None	SW-846 6010C		
PAHs	HEPA and Bulk	None	SW-846 8270D		
Asbestos	Air sample cassette	.0009 S/cc	NIOSH 7402		
MMVF	Air sample cassette	.01 f/cc	NIOSH 7402		

8.1 Analytical SOPs

All analytical procedures that shall be used in the project must be documented to allow for EPA review and approval. All Contractors shall provide and document how they shall perform specific analytical methods. Project SOPs that shall be used in this project are identified in Table 7.

Table 7. Analytical SOP Reference Table

Title, Revision Date and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization performing Analysis	Attachment Number

8.2 Analytical Instrument Calibration Procedures

The Contractor shall ensure that the analytical methods and selected instrumentation meet the project requirements for selective, sensitive, accurate, and precise detection and quantitation of the analytes of interest. It is also necessary to describe completely the calibration procedures for each analytical instrument, as well as demonstrate the ability of the analytical technique to accurately and precisely identify any quantitate the target analytes/COPC at the required quantitation limits and within the require measurement ranges. Corrective action procedures shall also be documented for instances when the instrument calibration procedures are not met.

All instruments shall be calibrated according to a schedule specified by the method and instrument manual or SOPs. Calibration procedures shall be documented in the analytical SOPs identified in
Table 7, Analytical SOP Reference Table.

8.3 Analytical Instrument and Equipment Maintenance, Testing, and Inspection Procedures

The Contractor shall describe in the analytical SOPs identified in Table 7 (Analytical SOP Reference Table) the procedures and documentation activities that shall be performed to ensure that all analytical instrumentation and equipment are available and in working order when needed. Instrument and equipment maintenance logs shall be kept by the Contractor to document analytical instrumentation and equipment maintenance, testing, and inspection activities. The Contractor shall also ensure that project schedules are met (e.g., availability of spare parts or spare instruments, instrument control (on-site and during storage), security, and availability (e.g., log-in/log-out procedures)).

9.0 Sample Collection Documentation, Handling, Tracking, and Custody Procedures

The Contractor shall include all sample collection documentation and sample handling, tracking, and custody procedures used to ensure that sample integrity and custody are maintained. The procedures shall address sample collection, packaging, handling, and shipping, as well as records, receipt of laboratory samples, archiving, and disposal. Chain-of-custody SOPs shall include those procedures associated with sampling and on-site and off-site laboratory analysis. Sample collection documentation and sample handling, tracking, and custody procedures shall be documented in the analytical SOPs identified in Table 7, Analytical SOP Reference Table. Procedures for field modification of the QAPP for sample collection documentation, sample handling, tracking, and custody procedures sampling design, number or type of samples or analyses, changing sampling locations, etc. are discussed in Section 12.1, Assessment Findings and Corrective Action Responses.

9.1 Sample Collection Documentation

Proper field sampling and on-site and off-site analytical documentation help to ensure sample authenticity (i.e., the sample identity is correct) and the data integrity. Documentation for sample collection shall include sample container identification, required sample identification and example. An electronic system, such as FORMS II Lite (which retrieves information store elsewhere) or Scribe or an alternative electronic format that is approved by EPA, may be used. The Contractor shall describe how the information on the label shall be preserved (e.g., by covering the label with clear tape to minimize water damage during transit).

9.2 Sample Handling and Tracking System

A proper sample tracking system shall support the chain-of-custody procedures, which in turn help to ensure sample authenticity and data defensibility. The Contractor shall document the procedures that shall be followed to identify and track samples that are collected in the field, analyzed on-site, and delivered or shipped to an off-site laboratory for analysis, as well as samples transferred throughout the laboratory. If samples are shipped to an off-site laboratory, then the laboratory's sample handling and tracking system must be described.

The sample handling and tracking procedures shall include:

- Sample numbering system for field sample collection and provide an example,
- Sample container identification information,
- Laboratory sample tracking procedures, and
- Sample storage procedures used by the field personnel, the off-site or mobile on-site laboratory.

9.2.1 Sample Handling

The following table identifies each component of the project specific sample handling system, personnel or organizational affiliations who are primarily responsible for ensuring proper sample handling, custody, storage, and disposal, and specify the length of time that samples, digestates and extracts, and biological collections shall be retained by the laboratory prior to disposal.

Contractor To Provide:
Insert Table or diagram
Table 8. Sample Handling System.

9.2.2 Sample Delivery

Each sample shall be delivered and packaged according to the following protocol and as specified in Attachment 4:

- Wipe samples: Wipe samples shall be placed directly in polyethylene tubes and capped. All capped samples shall be placed in zip-lock bags and labeled with the sample number, time and date of collection, analyses requested, and preservatives used.

- Microvac and Air Samples: remove the filter cassette from the inlet and outlet tubing sections, replace the cassette plugs, and place the sample into a labeled, resealable plastic bag. Label the sample bag with an identifier unique to the sample and sketch the sample location in a field book along with the unique sample identifier

- HEPA/HVAC Samples: Following collection of the sample into a dedicated collection bag, the bag is removed from the vacuum cleaner and placed into a 32-ounce glass jar or a zip-lock plastic bag. Storage of the samples at ambient temperature is appropriate for samples that will be analyzed only for inorganics.

  Note: One temperature blank shall be included in each shipped cooler to verify that the samples were maintained at the required temperature from the time they were placed in the cooler to their arrival at the laboratory. The temperature blank shall be prepared by filling a sample container with unpreserved potable or distilled water. The container shall be labeled "Temperature Blank" and dated. The receiving laboratory shall establish and record the temperature of the blank on the Chain of Custody Form immediately upon receipt, prior to inventory and refrigeration.

  Note: Do not use untreated polystyrene foam in the shipping container because electrostatic forces may cause fiber loss from sample filters.

Sealed bags shall be placed in plastic coolers and delivered to the laboratory. All sample documents shall be sealed in a plastic bag and affixed to the underside of each cooler lid. The lid shall be sealed and affixed on at least two sides with custody seals so that any sign of tampering is easily visible.

All packaging marking and labeling, and shipping samples shall be in compliance with the most recent U.S. Department of Transportation regulations for shipping hazardous and non-hazardous materials. Air carriers that transport hazardous materials require compliance with the current edition of the International Air Transport Association Dangerous Goods Regulations, which applies to shipment and transportation of hazardous materials by air carriers. Shipment papers including bills of landing and air bills, shall be retained by the laboratory with chain-of-custody records.

9.3 Sample Custody

Chain-of-custody procedures ensure accountability for the location and integrity of the sample at all times. A sample is in "custody" if it is in the actual physical possession of authorized personnel or in a secured area that is restricted to authorized personnel. An evidentiary paper trail documenting sample custody is required in order to meet project quality objectives. Sample custody documentation procedures shall be documented in the field and analytical SOPs identified in Table 7, Analytical SOP Reference Table.

A chain of custody record shall be maintained from the field sampling team's procedures for maintaining and documenting sample custody from the time samples are collected in the field through packaging, shipment, and delivery to the laboratory. Sample custody continues with the laboratory's procedures for maintaining and documenting sample custody from the time the samples are received at the laboratory through analysis, archiving, and disposal. Every transfer of custody must be noted and signed for, and a copy of this record kept by each individual who has signed. When samples (or groups of samples) are not under direct control of the individual responsible for them, they must be stored in a locked container sealed with a custody seal.

The chain of custody record shall include (at minimum) the following:

Sample identification number
Sample information
Sample location
Sample date
Name(s) and signature(s) of sampler(s)
Signature(s) of any individual(s) with custody of samples

At the end of each sampling event, the personnel who collected the samples shall generate chain of custody forms electronically using Forms II Lite software or Scribe or an alternative electronic format that is approved by EPA. The chain of custody forms shall be printed out and signed on-site. An electronic copy shall also be provided to EPA. This electronic file can be used by EPA to create spreadsheets or tables of validated analytical data.

A separate chain of custody form must accompany each cooler for each daily shipment. The chain of custody form must address all samples in that cooler, but not address samples in any other cooler. This practice maintains the chain of custody for all samples in case of mis-shipment.

10.0 QUALITY CONTROL SAMPLES

This section addresses quality control samples. Quality control (QC) is the set of activities that are performed for the purposes of monitoring, measuring, and controlling the performance of a measurement process. QC samples provide measurable data quality indicators used to evaluate the different components of the measurement system, including sampling and analysis.

10.1 Sampling and Analytical Quality Control Samples

This section details the Quality Assurance/Quality Control (QA/QC) requirements for field activities performed during the sampling effort.

Field spike samples shall be collected for lead analysis in order to assess if the laboratory digestion procedure used for the wipe material is capable of achieving recovery within the QC

limits of 80 to 120 %. A summary of the results for the spiked samples and the calculated percent recovery shall be provided in the final report. The results of the spike samples should be able to determine if the laboratory is able to achieve the recovery required for the analysis of lead wipe samples within the QC limits.

Field spike wipe samples for lead analysis shall be prepared by the laboratory. The spike samples shall be sent to the sampling contractor and shall be randomly inserted into the sample group for each building, for each day of sampling.

It should be noted that microvac and wipe sample field duplicates shall be co-located as close as possible to the original sample template.

QA/QC samples shall include the collection of one field duplicate and one matrix spike/matrix spike duplicate sample for each sampling technique at a ratio of 1 per 10 samples for each parameter. Extra sample volume shall be submitted to allow the laboratory to perform matrix spike sample analysis. This analysis provides information about the effect of sample matrix on digestion and measurement methodology. Field duplicate samples provide an indication of analytical variability and analytical error and shall not be identified to the laboratory.

Field blank samples shall be collected to determine if the sample media could become contaminated during the sampling event. One field blank (the field blank is opened inside of the unit, exposed) shall be collected for each parameter for every unit and HVAC that is sampled (HEPA vacuum, microvac, bulk, wipe). These samples are to be collected by removing the media from its container or package, handling as it as would be done during the actual sampling procedure and placing the media back into the sample container. Results of these samples shall determine if any contamination was detected above the reporting limit or established benchmarks for this program that would affect the results or quality of the data.

Lot blanks samples shall be collected to determine if the media used to collect the samples was contaminated. One lot blank (unopened media) shall be collected for each parameter each day (from HEPA vacuum, microvac, bulk, and wipe). Results of these samples shall determine if any contamination was detected in the sampling media above the reporting limit or established benchmarks for this program that would affect the results or quality of the data.

11.0 DATA MANAGEMENT TASKS

All project data and information must be documented in a format that is usable by project personnel. Therefore, the QAPP describes how project data and information shall be documented, tracked, and managed, from generation in the field to final use and storage, in a manner that ensures data integrity, defensibility, and retrieval.

11.1 Project Documentation and Records

All appropriate data, original field forms/data sheets, and chain-of-custody forms shall be

collected and completed in accordance with the instructions contained in the contract with the Primary Contractor and shall be submitted to EPA. This information shall be provided via Forms II Lite (F2L) or Scribe or an alternative electronic format that is approved by EPA. Lead and PAH samples and copies of necessary documentation shall be hand delivered daily to **[name of lab, address, and phone number]**. Asbestos and MMVF samples and copies of necessary documentation shall be hand delivered daily to **[name of lab, address, and phone number]**. All bulk dust samples and copies of necessary documentation shall be shipped daily by courier for next day delivery to **[name of lab, address, and phone number].**

The Primary Contractor shall also maintain a copy of each deliverable and all field documentation submitted under this project for 365 days. The Primary Contractor shall review all deliverables prior to its submission to the EPA. The review shall assure that each deliverable is accurate and complete, technically sound, and free of clerical errors**.**

11.2 Data Package Deliverables

All contractors are required by contract to maintain the field data, laboratory data and analysis results at the site that performed the analysis for 365 days after EPA acceptance of test results. Lab shall provide a copy of all sample calculations with each deliverable.

11.3 Data Reporting Formats

Any manual entry of data by the Primary Contractor or subcontractor into a database shall be verified by the following procedure. This procedure is to be followed from the inception of the project for all spreadsheets sent by the contractor to EPA for entry into the database.

a. The contractor's data analyst enters the validated data into a spreadsheet format.
b. The contractor's analyst prints out a hard copy of the spreadsheet and places it into the raw data file.
c. A second contractor data review analyst then reviews every entry that is made into the spreadsheet.
d. The contractor's review analyst then returns the file to original data entry analyst if errors are found.
e. Any found errors are corrected and steps b through d are repeated.
f. Documentation of this review and verification shall be maintained for each data file by the contractor.

Once the verification of the data is complete, the electronic file is sent to the EPA Region 2 Data Management Team and loaded into the database.

Analytical data files are to be received daily by EPA Region 2 Data Management Team electronically from the Primary Contractor. EPA shall load the result files (spreadsheets) received from the Primary Contractor into a local database. The spreadsheets the Primary Contractor shall provide are a collaboration of information from the contracted laboratory and

FORMS II *Lite*™ files or Scribe files or an alternative electronic format's files that are approved by EPA. EPA shall also load the F2L files or Scribe files or an alternative electronic format's files that are approved by EPA to ensure capture of any additional sampling information that may be useful.

11.4 Data Handling and Management/Tracking and Control

All project documentation shall be maintained in the EPA Project Files for World Trade Center related activities; this includes but is not limited to: records of communication, access agreements, field notes, field data sheets, quality assurance project plans, sampling plans, sampling reports, and summary tables of the analytical data. As required by the Data Management Supervisor all laboratory analytical data is to be submitted in electronic format only, unless otherwise specified by EPA. The data management team is responsible for maintaining these electronic files.

All documentation and records shall be maintained for a minimum of 1 year in the EPA Region 2 record center and shall be retired to the Federal Record Center for a minimum of 10 years.

12.0 Planned Assessments

In addition to the following, the System Audit procedure shall be conducted in accordance with the relevant sections of the Primary Contractor's Quality Assurance Manuals: Assessment And Response Actions.

The Primary Contractor shall observe sampling operations. The laboratory QA Officers shall review subsequent analytical results to ensure compliance with the QA/QC requirements of the project/sampling event.

All data generation and collection operations shall include at least one field sampling technical systems audit (TSA) at the start of field sampling activities so that effective corrective action measures can be implemented to mitigate the extent and impact of identified nonconformances. A thorough on-site audit shall be conducted during which sampling design, equipment, instrumentation, supplies, personnel, training, sampling procedures, chain-of-custody, sample handling and tracking, data reporting, data handling and management, data tracking and control, and data review procedures are examined for conformance with the QAPP. At least one field sampling TSA shall be performed at the start of field sampling activities. Results of the TSA shall be forwarded to the EPA QA Officer and EPA Site Coordinator within 14 days of the event. Additional TSAs may be specified at the discretion of the EPA Site Coordinator. EPA reserves the right to conduct unannounced TSA for all contracts.

12.1 Assessment Findings and Corrective Action Responses

In addition to the following, the Corrective Action procedure shall be conducted in accordance with the relevant sections of the Primary Contractor's and analytical laboratories' Quality

Assurance Manuals: Assessment And Response Actions.

All provisions shall be taken in the field and laboratory to ensure that any problems that may develop shall be dealt with as quickly as possible to ensure the continuity of the project/sampling events. Field modifications to procedures in the QAPP must be approved verbally by the EPA Site Coordinator before the modifications are implemented and then documented in the Site Logbook and the Sampling Project Report. Corrective action in the field may be necessary when the sampling design is changed. A change in the field may include, for example: increasing the number or type of samples or analyses; changing sampling locations and/or modifying sampling protocol. When this occurs, the Primary Contractor shall identify any suspected technical or QA deficiencies and note them in the field logbook. The analytical laboratory QA officer shall be responsible for assessing the suspected deficiency and determining the impact on the quality of data.

13.0 QA Management Reports

Periodic QA management reports ensure that managers and stakeholders are updated on project status and results of all QA assessments. Efficient communication of project status and problems allows project managers to implement timely and effective corrective actions so data generated can meet PQOs. The Primary Contractor shall provide EPA with all data, original field forms/data sheets, and chain of custody forms for this project. For the duration of the project, on every Wednesday the Primary Contractor shall submit an email to EPA providing a field status report/QA management report, indicating the work completed during the prior week. Assessment checklists, reports, requests for corrective action letters, and the corrective response letters (refer to Section 12.1) shall be included as attachments to or referenced in the QA management reports.

All QA management reports shall be included as attachments to the final project report. The following issues shall be included in the final project report, either as part of the QA management report or in a QA/QC section of the final project report:

Summary of project QA/QC programs and training conducted during the project;
Conformance of project activities to QAPP requirements and procedures;
Status of project and schedule delays;
Deviations from the approved QAPP and approved amendments to the QAPP;
Results and trends of proficiency testing (PT) samples performed by all laboratories (per analytical group, matrix, and concentration level);
Description and findings of TSAs and other assessments;
Results of data review activities in terms of amount of usable data generated;
Required corrective actions and effectiveness of corrective action implementation;
Data usability assessments in terms of precision, accuracy, representativeness, completeness, comparability, and sensitivity; and
Limitations on the use of measurement data generated.

14.0 Final Project Report

The issues listed above must be addressed in the QA management reports (as attachments to the final project report) or the QA/QC section of the final project report to be submitted to EPA within 30 days from the completion of the sampling portion of the project. The final project report shall be prepared to provide a detailed accounting of what occurred during this project. Information provided shall include: time of major events, dates, personnel on site (including affiliations), summarize and describe the sampling program and field activities, and include any deviations from the QAPP, SOPs, and standard methods. Maps depicting site layout, contaminant source areas, and sample locations shall be included in the project report. A map depicting each building unit and the sample locations shall be generated in a 24" x 36" format. Information regarding the analytical methods or procedures employed, sample results, QA/QC results, chain of custody documentation, laboratory correspondence, any deviations from the QAPP, SOPs, and standard methods, and raw data shall be provided within the QA management reports (as attachments to the final project report) or the QA/QC section of the final project report. The final project report must also address additional data quality concerns, including, but not limited to, the following:

Narrative and timeline of project activities;
Summary of PQO development;
Reconciliation of project data with PQOs;
Summary of major problems encountered and their resolution;
Data summary, including tables, charts, and graphs with appropriate sample identification or station location numbers, concentration units, percent solids (if applicable), and data quality flags; and
Conclusions and recommendations.

15.0 Overview/Data Review Steps

Sections 15.1 through 15.3 of this QAPP defines three distinct evaluative steps that are used to ensure that project data quality needs are met. These data review steps are required for all data collected and used in environmental projects. All three data review steps apply to all aspects of data generation, including field sampling and analytical activities.

15.1 **Step I: Verification** (review for completeness)

Primary contractor responsible for the confirmation by examination and provision of objective evidence that the specified requirements (i.e., sampling and analytical procedures) have been completed.

15.2 Step II: Validation

The Validation Contractor shall confirm by examination and provision of objective evidence that the particular requirements for a specific intended use are fulfilled. Validation is a sampling and analytical process that includes evaluating compliance with method, procedure, or contract

requirements and extends to evaluating against criteria based on the quality objectives developed in the QAPP (e.g., the QAPP measurement performance criteria [MPC]). The purpose of validation is to assess the performance of the sampling and analysis processes to determine the quality of specified data. It is divided into two subparts:

– Step IIa assesses and documents compliance with methods, procedures, and contracts.

– Step IIb assesses and documents a comparison with MPC in the QAPP.

15.3 Step III: Usability Assessment

The Primary Contractor shall make a determination of the adequacy of data, based on the results of validation and verification, for the decisions being made. The usability step involves assessing whether the process execution and resulting data meet project quality objectives documented in the QAPP.

Table 9 below describes the objectives, scope, steps, and output of data review associated with each process term.

Table 9. Data Review

Process Term	Objective	Scope	Data Review Step	Output
Verification	Review to see if data required for the project are available.	– Sampling – Analysis	I. Completeness check	Verification Report Package includes all documentation
Validation	– Assess and document the performance of the field sample collection process. – Assess and document the performance of the analytical process.	– Sampling – Analysis	IIa. Check compliance with method, procedure, and contract requirements. IIb. Compare with measurement performance criteria from the QAPP	Validation Report Includes qualified data
Usability Assessment	Assess and document usability to meet project quality objectives.	- Sampling - Analysis	III. Assess usability of data by considering project quality objectives and the decision to be made.	Usability Report

Laboratory analytical results shall be assessed by the data reviewer for compliance with required precision, accuracy, completeness, representativeness, and sensitivity.

The Primary Contractor shall perform the usability assessment to ensure that the PQOs are understood and the full scope is considered. The items listed in Table 10 below are examples of specific items that shall be considered during this project under the usability assessment.

Table 10. Usability Assessment

Item	Assessment Activity
Data Deliverables and QAPP	Ensure that all necessary information was provided, including but not limited to validation results.
Deviations	Determine the impact of deviations on the usability of data.
Sampling Locations, Deviation	Determine if alterations to sample locations continue to satisfy the project objectives.
Chain-of-Custody, Deviation	Establish that any problems with documentation or custody procedures do not prevent the data from being used for the intended purpose.
Holding Times, Deviation	Determine the acceptability of data where holding times were exceeded.
Damaged Samples, Deviation	Determine whether the data from damaged samples are usable. If the data cannot be used, determine whether resampling is necessary.
PT Sample Results, Deviation	Determine the implications of any unacceptable analytes (as identified by the PT sample results) on the usability of the analytical results. Describe any limitations on the data.
SOPs and Methods, Deviation	Evaluate the impact of deviations from SOPs and specified methods on data quality.
QC Samples	Evaluate the implications of unacceptable QC sample results on the data usability for the associated samples. For example, consider the effects of observed blank contamination.
Matrix	Evaluate matrix effects (interference or bias).
Meteorological Data and Site Conditions	Evaluate the possible effects of meteorological (e.g., wind, rain, temperature), source attributions, and site conditions on sample results. Review field reports to identify whether any unusual conditions were present and how the sampling plan was executed.
Comparability	Ensure that results from different data collection activities achieve an acceptable level of agreement.
Completeness	Evaluate the impact of missing information. Ensure that enough information was obtained for the data to be usable (completeness as defined in PQOs documented in the QAPP).
Background	Determine if background levels have been adequately established (if appropriate).
Critical Samples	Establish that critical samples and critical target analytes/COPC, as defined in the QAPP, were collected and analyzed. Determine if the results meet criteria specified in the QAPP.

Item	Assessment Activity
Data Restrictions	Describe the exact process for handling data that do not meet PQOs (i.e., when measurement performance criteria are not met). Depending on how those data shall be used, specify the restrictions on use of those data for environmental decision-making.
Usability Decision	Determine if the data can be used to make a specific decision considering the implications of all deviations and corrective actions.
Usability Report	Discuss and compare overall precision, accuracy/bias, representativeness, comparability, completeness, and sensitivity for each matrix, analytical group, and concentration level. Describe limitations on the use of project data if criteria for data quality indicators are not met.

16.0 Streamlining Data Review

Streamlining data review refers to a process of eliminating some requirements for validation that are deemed no longer necessary to preserve data integrity. Streamlining data review is meant to reduce time and costs while still confirming the quality of the data. Thus, any streamlining option shall recognize that:

- the types and amounts of data reviewed shall be sufficient to develop a clear understanding of the quality of the data;
- the practice of reviewing a subset of data (or a data indicator such as a successful PT sample) as a substitute for reviewing all data shall be reevaluated if problems are detected that call into question the quality of the data set; and
- streamlining data review occurs when efficiencies are created in the data review process by the following actions:
    - looking at a subset of data that is representative of a larger universe, and
    - examining the data in an alternative manner (e.g., through the use of batch-specific PT samples).

Any decisions with regards to streamlining shall only occur in consultation with EPA's QATS contractor and in consultation with, and the approval of, the EPA Site Coordinator as to the nature and type of streamlining to be conducted.

17.0 REFERENCES

EPA Requirements for Quality Assurance Project Plans, QA/R-5, March 2001

US EPA Region 2 Guidance for the Development of Quality Assurance Project Plans for Environmental Monitoring Projects, April 2004

Intergovernmental Data Quality Task Force Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP) Manual, Version 1, 505-B-04-900A, July 2004

Quality Assurance Technical Support Program, Data Validation Standard Operating Procedures

SW-846 Method 6010C, Inductively Coupled Plasma-Atomic Emission Spectrometry

SW-846 Method 8270D, Semivolatile Organic Compounds by GC/MS

SW-846 Method 9045C, pH Electrometric Measurement

EPA AHERA Methodology

US EPA. 2003a. World Trade Center Indoor Environment Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks. Prepared by the Contaminants of Potential Concern Committee of the World Trade Center Indoor Air Task Force Working Group. May, 2003.

OSWER Directive 9240.0-05A, "Specifications and Guidance for Contaminant Free Sample Containers"

ASTM Standard Method Micro vacuum Sampling and Indirect Analysis of Dust by Transmission Electron Microscopy for Asbestos Structure Number Concentrations, designation D 5755-95

ASTM Standard Practice for Field Collection of Organic Compounds from Surfaces Using Wipe Sampling, designation D 6661-01

NIOSH Methods 5506, 7300, 7402, 9002

In addition, methods contained in the Housing and Urban Development (HUD) Appendix 13.1: Wipe Sampling for Settled Lead-Contaminated Dust.

TABLE 1						
DISTRIBUTION LIST						
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PROJECT PERSONNEL SIGN-OFF SHEET				
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Project Personnel	***Title***	***Telephone Number***	***Signature***	***Date QAPP Read***